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(54) **MASSAGING DEVICE FOR A REST ARMCHAIR**

(57) The device is intended to make massages of the left side of the user's back independently from the right side of the user's back, with the added possibility of regulating the intensity of such massage also independently in the modes of kneading, tapping vertical displacement. It has four independent motors (1, 3, 10 and 12) governed by a control unit (18) and which transmit the rotation to respective excentric (2, 4, 11 and 14) or centered (22) axes which are connected to conventional massage applying elements (5 and 14). Said axes (2, 4, 11 and 14) or (22) include sensors (17) which inform on the angular position. The device is also provided with two motors (9 and 16) for the vertical displacement which are also connected to the control unit (18).

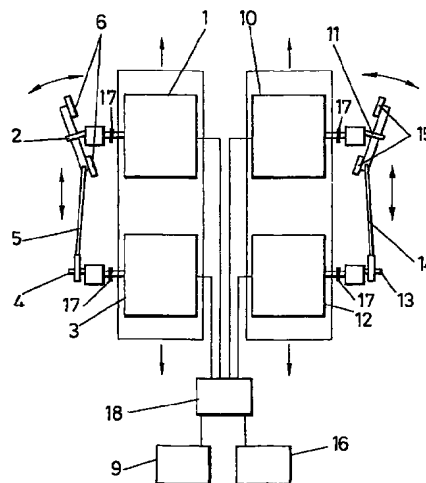


FIG. 1

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## Description

### OBJECT OF THE INVENTION

[0001] This invention, as already stated in the abstract to this description, concerns a massage device for a rest armchair, the purpose of which consists of permitting massaging in a completely independent and combined manner on the right-hand and left-hand regions of the back, in both the kneading and tapping modes and in the displacement of the massage-proportioning elements; for this purpose it incorporates four motors governed by a control unit, instead of the two motors typical of conventional massaging chairs.

### BACKGROUND TO THE INVENTION

[0002] Massaging chairs are known which provide massage of the kneading or tapping type employing two motors which transmit their motion to a number of dependent shafts and massaging elements, all this being in such a manner that if the rotation of these motors occurs in one direction then a kneading massage is provided on both sides of the user's back, whilst if the rotation is in the opposite direction a tapping massage is provided on both sides of the back.

[0003] Thus, North American patents numbers 5052376, 5137016 and 5460598 include massage application devices for armchairs, which include two eccentric and inclined shafts, which connect to the actual massage-proportioning elements. These shafts are driven by motors in such a way that the rotation of the motors in one direction results in one type of massage, whilst the rotation in the opposite direction determines another type of massage.

[0004] Moreover, also known are the publications of patent application numbers JP-A-7-323057, WO-A-97/37627, JP-A-02-279157, JP-A-02-172466, JP-A-9-75416, PCT/DE 97/00873 and JP-A-9-38167. All the foregoing applications concern massage devices, but none of them includes four independent motors that can provide an independent massaging effect on the right-hand and left-hand side, as in the case of the invention in question.

[0005] In addition, nor do they permit independent massaging on the right-hand and left-hand sides.

[0006] Finally, these devices clearly cannot regulate/adjust the intensity or speed of massaging on the left-hand side with respect to the right-hand side, or vice versa for the purpose of applying said massages with different intensities or speeds as a function of the taste or therapeutic requirement of the user.

### DESCRIPTION OF THE INVENTION

[0007] To achieve the objectives and avoid the inconveniences mentioned above, the invention consists of a massage device for a rest armchair which

includes four shafts, two of these being coupled to a massage application device for the left-hand side of the user's back, while the other two are coupled to a massage application element for the right-hand side of the user's back. The invention includes means for: independent massage of the left side or right side of the user, both for kneading and tapping, with the possibility of regulating the intensity or speed on each side in an independent manner; synchronised or unsynchronised massage on both sides of the user's back; variation in the direction of kneading massage on the left-hand region; Variation in the direction of kneading massage on the right-hand region; multiple positioning of opening in vertical massage in an independent manner for the left-hand and right-hand regions of the back; and multiple positioning of applied pressure in vertical massage in an independent manner for the left-hand and right-hand regions of the back. According to the invention four independent motors connected to a control unit have been provided for. One of the motors determines a kneading type massage on the left-hand side of the back, another of the motors determines a kneading type massage on the right-hand side of the back, another of the motors determines a tapping type massage on the left-hand side of the back and the other motor determines a tapping type massage on the right-hand side of the back.

[0008] In addition to these four motors there are two motors connected to the aforementioned control unit and to two spindles, one of them for vertical displacement (raising or lowering) of the two previous motors corresponding to the left-hand side and the other for vertical displacement (raising or lowering) of the two previous motors corresponding to the right-hand side.

[0009] Moreover, the four motors first referred to, include position sensors connected to a microprocessor in the control unit in order to know all the time the position of their rotors, granting thereby greater possibilities of control, synchronising or unsynchronising of their movement and the type of massage.

[0010] These motors, spindles and the massage application elements are housed in the back of the corresponding armchair.

[0011] With this configuration, even with one of the motors of the massage armchair faulty, many facilities are still available.

[0012] This configuration permits in a novel and beneficial way the provision of the following types of massage:

- The most important and relevant feature offered by this device is that it permits the intensity or speed on the left-hand side to be operated independently with respect to the right-hand side, or vice versa, as a function of the requirement or therapeutic prescription of the user. To achieve this, use is made of the control unit, which includes conventional means for regulating said balance of intensities or speeds.

- Kneading massage, individualised and synchronised in both directions.

**[0013]** By putting both kneading motors into operation, right and left, the massage obtained is uniform, on both sides of the back.

**[0014]** The direction of rotation of the two kneading motors, right and left, can be reversed individually, whereby it is possible to obtain:

- \* Right-hand and left-hand kneading from inside to outside.
- \* Right-hand and left-hand kneading from outside to inside.
- \* Right-hand kneading from inside to outside and left-hand from outside to inside.
- \* Right-hand kneading from outside to inside and left-hand from inside to outside.

- Tapping massage, individualised and synchronised.

**[0015]** This type of massage is achieved by putting both tapping motors into operation, left-hand and right-hand in unison, whereby the massage is obtained on both sides of the back.

**[0016]** In this type of massage the change of direction in the motor rotation has no sense since no change of massage type is obtained.

- Kneading massage (in both directions) and tapping simultaneously.

**[0017]** By putting the right-hand and left-hand kneading motors into operation, together with the left-hand and right-hand tapping motors, the two types of massage are obtained at the same time on both sides of the back.

**[0018]** If the direction of rotation of one or both kneading motors is changed, said massage is performed either from inside to outside or vice versa, on one or on both sides of the back, as a function of the requirements of the person receiving the massage.

- Individual kneading massage of the right-hand region, in both directions.

**[0019]** This massage is achieved by putting into operation the right-hand kneading motor, in either one or other direction, in order to obtain a massage from inside to outside, or vice versa.

- Individual kneading massage of the left-hand region, in both directions.

**[0020]** This massage is achieved by putting into operation the right-hand kneading motor only, in either one or other direction, in order to obtain a massage from

inside to outside, or vice versa.

- Individual tapping massage of the right-hand region.

**[0021]** In this case, said massage is achieved by putting into operation the right-hand tapping motor only.

- Individual tapping massage of the left-hand region.

**[0022]** This massage is achieved on the desired side by putting into operation the left-hand tapping motor only.

- Kneading massage of the right-hand region (in both directions) and tapping massage on the left-hand side.

**[0023]** This combination of massages is achieved by putting into operation the right-hand kneading motor and the left-hand tapping motor. At the same time it is possible to select the direction of rotation of the kneading motor, in order to obtain a massage either from inside to outside, or vice versa.

**[0024]** Kneading massage of the left-hand region (in both directions) and tapping massage on the right-hand side.

**[0025]** This combination of massages is achieved by activating at the same time the left-hand kneading motor and the right-hand tapping motor. At the same time it is possible to select the direction of rotation of the kneading motor, in order to have said massage either from inside to outside, or vice versa.

- Kneading massage, individual and synchronised, in both directions.

**[0026]** This effect is achieved by means of the position sensor situated on each of the kneading motors, which inform of the position in which each of their two shafts is.

**[0027]** In this way it is possible to have the right-hand and left-hand kneading shafts rotating with an angular displacement of X degrees, determined by the spacing given on the position sensor plate.

**[0028]** At the same time as an unsynchronised massage is obtained with all angular displacement of X degrees, it is possible to reverse the direction of rotation of the motors, either in unison or separately, whereby the massage takes place from inside to outside, or vice versa.

- Tapping massage, individual and unsynchronised.

**[0029]** Unsynchronised tapping massage is achieved by mounting on each of the kneading motors, a sensor which monitors the position in which the shaft is located. In this way it is possible to have the right-

hand and left-hand tapping shafts rotating with a phase displacement of X degrees, determined by the spacing given on the position sensor plate.

- Various opening options in vertical massage, with or without tapping.

[0030] By means of the position sensors that control the right-hand and left-hand kneading motors, the parking of the opening of the massage wheels is controlled, whereby a multitude of different openings is achieved for the spacing between the right-hand and left-hand massage wheels.

[0031] In this way it is possible to have vertical massage with several different apertures.

[0032] If, at the same time, the tapping massage is actuated, the resulting massage will be performed with a controlled spacing between massage wheels.

- Various pressure applications options in vertical massage, with or without kneading independently.

[0033] By means of the position sensors that control the right-hand and left-hand tapping motors, the parking of the pressure of the eccentrics with respect to the back is controlled.

[0034] In this, way it is possible to perform the vertical massage with a determined pressure as a function of the position in which the position sensor is parked.

[0035] If, in this way, the vertical massage is put into operation, it will take place with the predetermined pressure. If, at the same time, the kneading massage is actuated, either on one or on both sides, and, in one direction or the other, the desired massage combination will be achieved.

[0036] Below, in order to facilitate a better understanding of this description and forming an integral part thereof, a number of figures are attached in which, by way of illustration and in no way limiting, the object of the invention is shown.

#### **BRIEF DESCRIPTION OF THE FIGURES**

[0037]

Figure 1 shows in schematic form a block diagram of a massage device for a rest armchair implemented according to this invention.

Figure 2 shows a front view with partial cross-sections of the four kneading and tapping motors that are employed by a massage device for a rest armchair implemented according to this invention.

Figure 3 shows a side view of a conventional massage application element, which is connected to two of the motors referred to in the previous figure 2.

Figure 4 shows in a very schematic form the massage device of the invention housed in the corre-

sponding armchair, showing a side view and cross-section of said armchair.

Figure 5 shows a front view of the same four motors as were referred to in figure 2, but having coupled to them two conventional massage application elements, similar to that referred to in figure 3.

Figure 6 shows a variant of the invention similar to the previous figure 5 but the transmission taking place through pulley wheels instead of reducing gears, and the four motors being grouped together in a common casing instead of independently.

Figure 7 shows another variant of the invention similar to the previous figure 6 but the transmission taking place directly from the rotors of the motors to the massage shafts.

Figure 8 shows a front view, partial and with cross-section, of another variant of the invention, in which the eccentric shafts of the motors are replaced with centred shafts, the necessary eccentricities being obtained by means of additional piece parts.

Figure 9 shows a perspective view, complete and with cross-section, and with the two details expanded, of the variant of the invention referred to in the previous figure 8.

#### **DESCRIPTION OF ONE OR MORE EMBODIMENTS OF THE INVENTION**

[0038] Below is given a description of four examples of the invention, reference being made to the numbering adopted in the figures.

[0039] Thus, the massage device for a rest armchair of the first embodiment incorporates a left-hand kneading massage motor 1 which by means of reducing gears transmits the motion of an inclined, eccentric, left-hand shaft 2 and of a left-hand tapping motor 3 which by means of reducing gears transmits the motion to a left-and eccentric shaft 4.

[0040] The shafts 2 and 4 connect to a conventional massage application element 5 the wheels of which 6 are those which from the inside of the corresponding armchair 7 are applied to the left-hand part of the user's back. At the same time, all these elements 1 to 5 can be displaced in a block by a spindle 8 by means of a left-hand displacement motor 9.

[0041] Likewise, for the right-hand side the device of this first embodiment incorporates a right-hand kneading massage motor 10 which by means of reducing gears transmits the motion of an inclined, eccentric, right-hand shaft 11 and a right-hand tapping motor 12 which by means of reducing gears transmits the motion to a right-hand eccentric shaft 4.

[0042] The shafts 11 and 13 connect to a conventional massage application element 14 the wheels of which 15 are those which are applied to the right-hand part of the user's back from the inside of the corresponding armchair 7.

[0043] All these elements 10 to 15 can be displaced

in a block by a spindle (not shown in the figures for being analogous to spindle 8) by means of a right-hand displacement motor 16.

[0044] In addition, the four motors 1, 3, 10 and 12 are equipped with respective magnetic sensors 17 connected to a microprocessor (not shown in the figures in order to achieve greater clarity) which permit an exact knowledge of the angular position of the shafts 2, 4, 11 and 13.

[0045] The four motors for kneading and tapping (1, 3, 10 and 12), the displacement motors (9 and 16) and the aforementioned microprocessor are connected to an electronic control unit 18 which governs the actuation of each of the six motors as a function of the commands it receives, as a function of the position of the mentioned shafts 2, 4, 11 and 13 and by means of the appropriate software.

[0046] Thus, depending on the motors that are actuated and according to the direction of rotation they are given, all the types of massage described in the section "DESCRIPTION OF THE INVENTION" are made possible, these are:

- Individualised, synchronised kneading massage, in both directions (motors 1 and 10).
- Individualised, synchronised tapping massage (motors 3 and 12).
- Kneading massage in both directions with tapping at the same time (motors 1, 3, 10 and 12).
- Individualised kneading massage on the right-hand region, in both directions (motor 10).
- Individualised kneading massage on the left-hand region, in both directions (motor 1).
- Individualised tapping massage on the right-hand region (motor 12).
- Individualised tapping massage on the left-hand region (motor 3).
- Kneading massage in the right-hand region in both directions, and tapping on the right (motors 1 and 12).
- Kneading massage, individualised and unsynchronised in both directions (sensors 17 of the motors 1 and 10).
- Tapping massage, individualised and unsynchronised (sensors 17 of the motors 3 and 12).
- Three opening options in vertical massage, with or without tapping (sensors 17 of the motors 1 and 10).
- Three pressure options in vertical massage, with or without kneading (sensors 17 of the motors 3 and 12).

[0047] The second embodiment is similar to the previous one, with the difference that the transmissions of the corresponding motors 1, 3, 10 and 12 are achieved by means of pulleys and belts 19 instead of reducing gears, and that said four motors 1, 3, 10 and 12 are fixed in a common casing 20.

[0048] Logically, in this case, there is only one spindle with a displacement motor that has not been shown in the figures for being analogous to the elements 8 and 9 of the previous example.

[0049] This second example offers the same massaging possibilities as were indicated above for the first example, though here it is clearly impossible to have independence in displacement of the left-hand motors 1 and 3 with respect to the right-hand motors 10 and 12 as they are mounted in the common casing 20; though on the other hand, there would be no technical inconvenience in dividing or separating the casing 20 into two parts, one for motors 1 and 3, and the other for motors 10 and 12, and effect the displacements by means of two spindles and two independent motors similar to the motors 9 and 16 of the previous example.

[0050] Another alternative type of motor-shaft transmission, and bearing in mind that this concept is not the object of the patent, is shown in the third embodiment and consists in making use of direct transmission from the rotors of the motors 1, 3, 10 and 12 to the shafts 2, 4, 11 and 13 respectively, as illustrated in figure 7. In this case the motors 1, 3, 10 and 12 are mounted in a common casing 21 and all that has been said for the second example is equally applicable to this third embodiment, though it is possible to opt for assembly in independent casings.

[0051] Logically, as well as the motor-shaft transmissions by means of reducing gears, pulleys or directly, it is possible to make use of any other type of transmission existing or that may be developed in the future and which is suitable for application to this invention.

[0052] The fourth example of implementation is also similar to the first in so far as operation is concerned, but with the difference that the eccentric shafts 2, 4, 11 and 13 which connect to the massage application elements 5 and 14, are replaced by respective centred shafts 22 which in addition project inwards instead of outwards, such that the four centred shafts 22 face each other two by two.

[0053] Each facing pair of centred shafts 22 is accompanied by a centrally positioned support bearing 23 which connects to said two shafts 22, in such a way that these two shafts 22 provide each other with mutual support but maintain independence with respect to their rotational motion, as illustrated in figure 8.

[0054] Finally, on each of the four centred shafts 22 an eccentric transmission device 24 is mounted which is connected to the corresponding massage application element 5 or 14.

[0055] With this configuration, this fourth example offers all the advantages and facilities of the first example but with the added advantage that its components have to tolerate less mechanical stress since the rotors of the motors do not suffer the vibrations resulting from the eccentric elements.

## Claims

1. **MESSAGE DEVICE FOR A REST ARMCHAIR**, which incorporates four shafts (2, 4, 11 and 13, or 22), two of these being coupled to a massage application element (5) for the left-hand side of the user's back, while the other two are coupled to a massage application device (14) for the right-hand side of the user's back; characterised in that they count with means for:
  - independent massage for the left-hand or right-hand side of the user, for both kneading and tapping, with the possibility of regulating the intensity or speed on each side in an independent manner;
  - synchronised or unsynchronised massage on both sides of the user's back;
  - variation in the kneading massaging direction on the left-hand region;
  - variation in the kneading massaging direction on the right-hand region;
  - multiple positioning of opening for vertical massaging in an independent manner for the left-hand and right-hand regions of the back, and
  - multiple positioning of pressure for vertical massaging in an independent manner for the left-hand and right-hand regions of the back.
2. **MESSAGE DEVICE FOR A REST ARMCHAIR**, in accordance with claim 1, characterised in that said means consist of:
  - a left-hand kneading motor (1) which transmits rotation to a first of said four shafts,
  - a right-hand kneading motor (1) which transmits rotation to a second of said four shafts,
  - a left-hand tapping motor (3) which transmits rotation to a third of said four shafts,
  - a right-hand tapping motor (12) which transmits rotation to a fourth of said four shafts,
  - a number of sensors (17) of the angular position of said four shafts, connected to a micro-processor, and
  - a control unit (18) through which said micro-processor and the four motors (1, 3, 10, 12) are connected; being independent the motors (1, 3, 10 and 12) referred to.
3. **MESSAGE DEVICE FOR A REST ARMCHAIR**, in accordance with claim 2, characterised in that to the control unit (18) is also connected a left-hand displacement motor (9) which enables joint vertical displacement via by means of a spindle (8) of the motors for left-hand kneading massage (1) and left-hand tapping massage (3); being also connected to said control unit (18) a right-hand displacement motor (16) which enables joint vertical displacement via another spindle of the motors for right-hand kneading massage (10) and right-hand tapping massage (12).
4. **MESSAGE DEVICE FOR A REST ARMCHAIR**, in accordance with claim 2, characterised in that the four motors referred to (1, 3, 10 and 12) are able to be fixed in a common casing (20 or 21), in which case there is a single vertical displacement motor via a spindle which connects with the control unit (18).
5. **MESSAGE DEVICE FOR A REST ARMCHAIR**, in accordance with claims 1 or 2, characterised in that said four shafts are four centred shafts (22) which project towards the inside and which are facing each other two by two; there being between each pair of centred facing shafts (22) a support bearing (23) which connects to the shafts (22) of the corresponding pair, whereby said two shafts (22) provide each other with mutual support maintaining their rotational motions independent; and being located over each of the four centred shafts (22) an eccentric transmission device (24) which is connected to the corresponding massage application element (5 or 14).
6. **MESSAGE DEVICE FOR A REST ARMCHAIR**, in accordance with claim 2, characterised in that said four shafts are one left-hand, inclined and eccentric shaft (2), one right-hand, inclined and eccentric shaft (11), one left-hand eccentric shaft (4) and one right-hand eccentric shaft (13); being respectively connected these shafts (2, 11, 4 and 13) to the left-hand kneading massaging motor (1), the right-hand kneading massaging motor (10), the left-hand tapping massaging motor (3) and the right-hand tapping massaging motor (12).
7. **MESSAGE DEVICE FOR A REST ARMCHAIR**, in accordance with claim 6, characterised in that the rotational transmissions of the motors referred to (1, 3, 10 and 12) to the aforementioned shafts (2, 4, 11, and 13) are achieved by means of reducing gears.
8. **MESSAGE DEVICE FOR A REST ARMCHAIR**, in accordance with claim 6, characterised in that the rotational transmissions of the motors referred to (1, 3, 10 and 12) to the aforementioned shafts (2, 4, 11 and 13) are achieved by means of pulleys and belts (19).
9. **MESSAGE DEVICE FOR A REST ARMCHAIR**, in accordance with claim 6, characterised in that the rotational transmissions of the motors referred to (1, 3, 10 and 12) to the aforementioned shafts (2, 4,

**11, 13)** are achieved directly by means of the rotors of said motors **(1, 3, 10 and 12)**.

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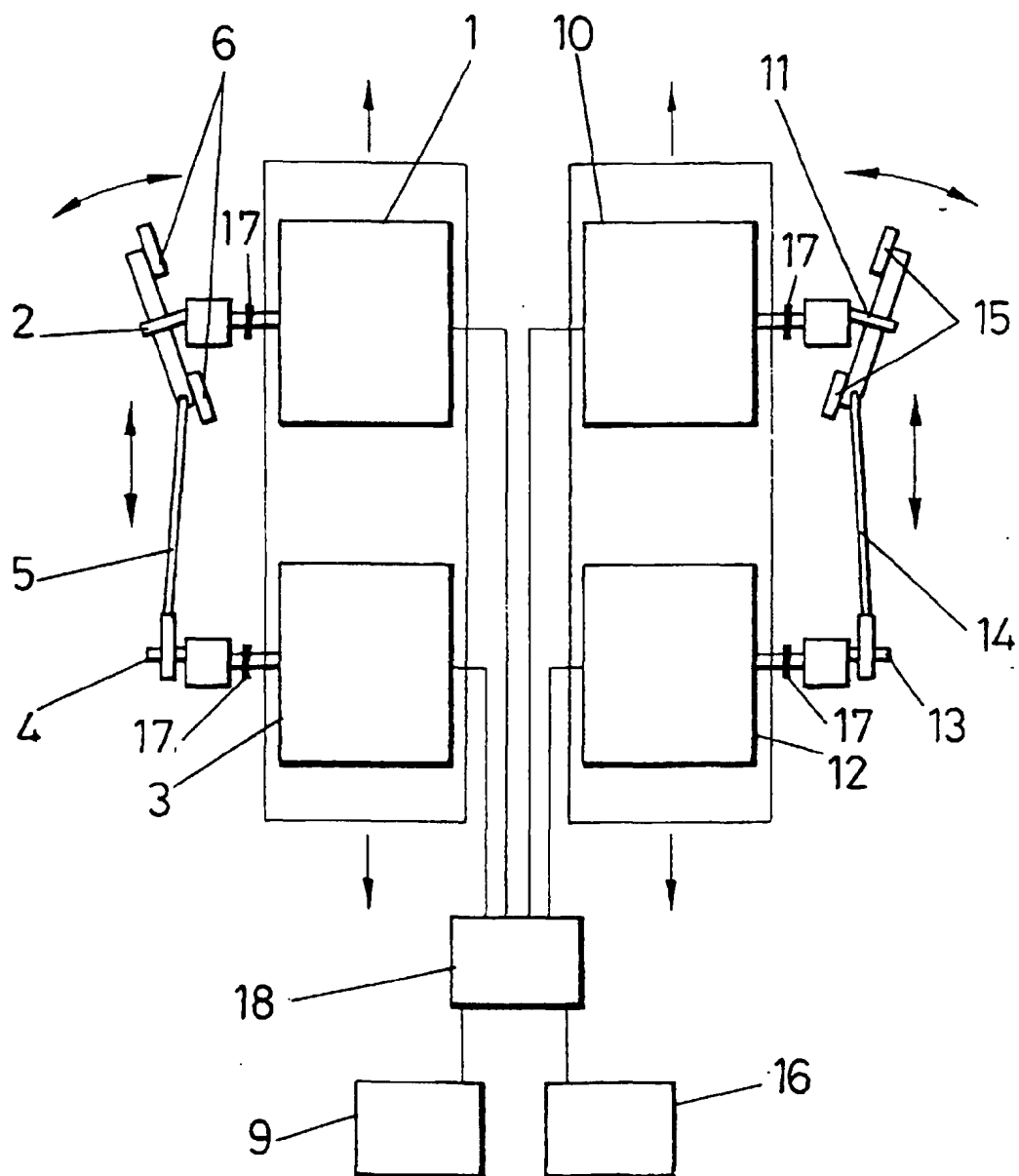


FIG. 1



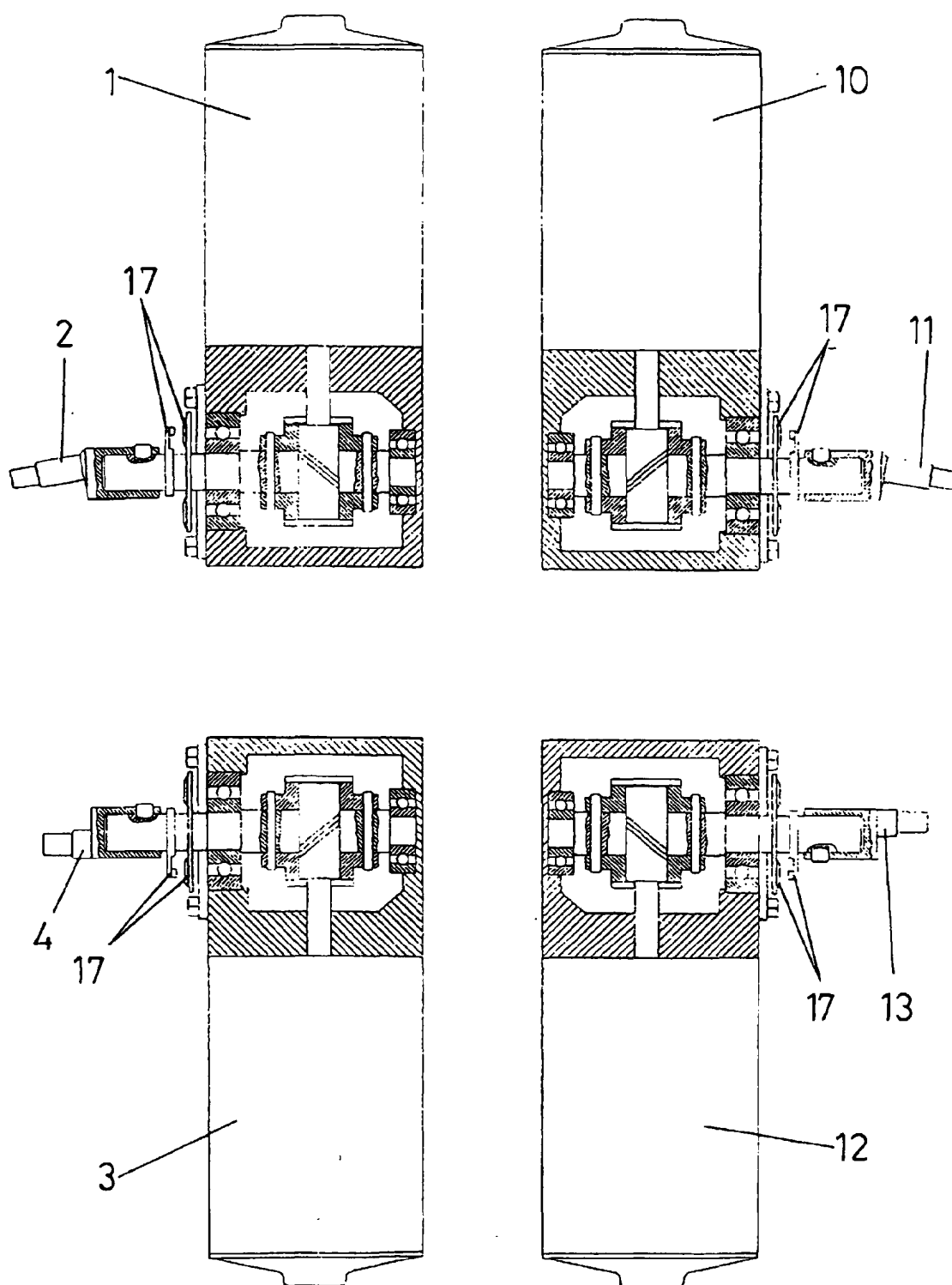


FIG. 2

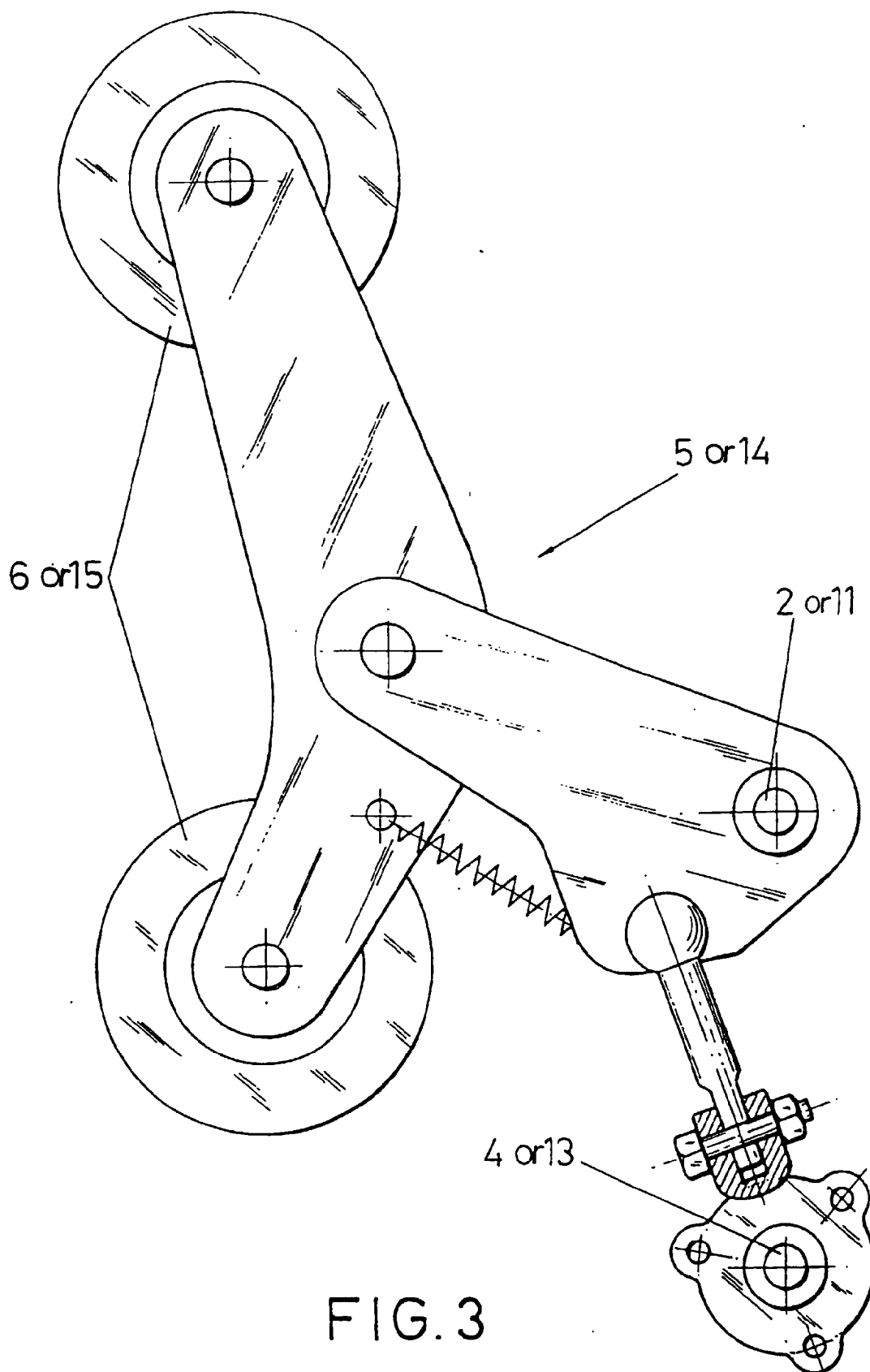


FIG. 3

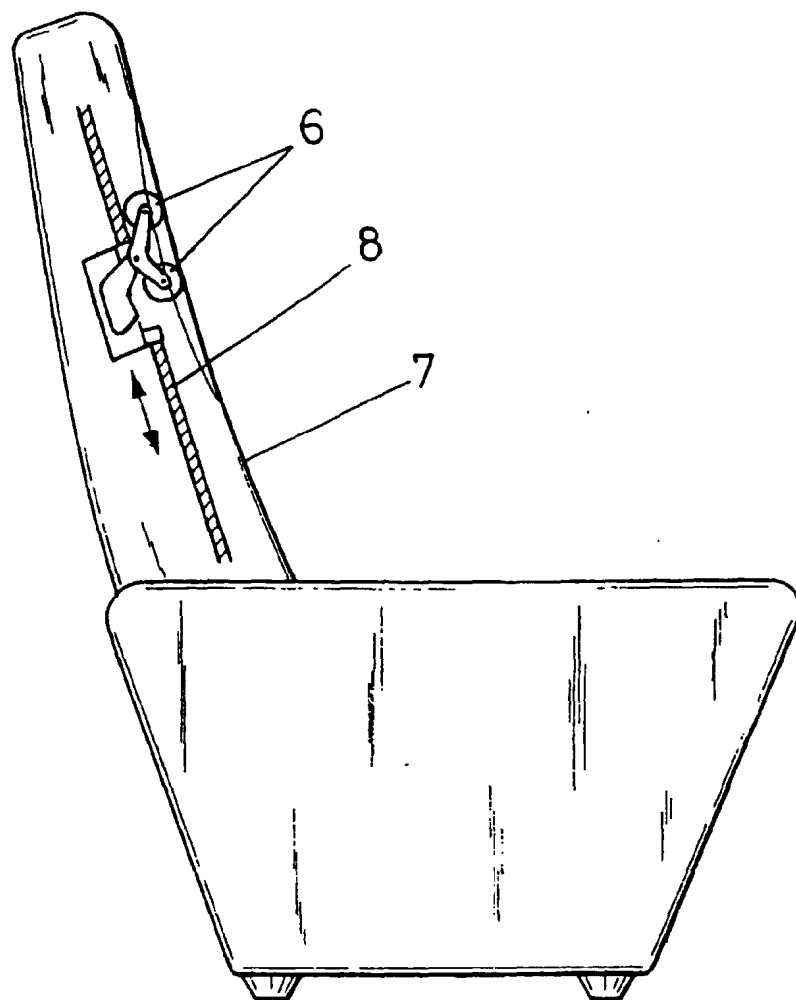


FIG.4

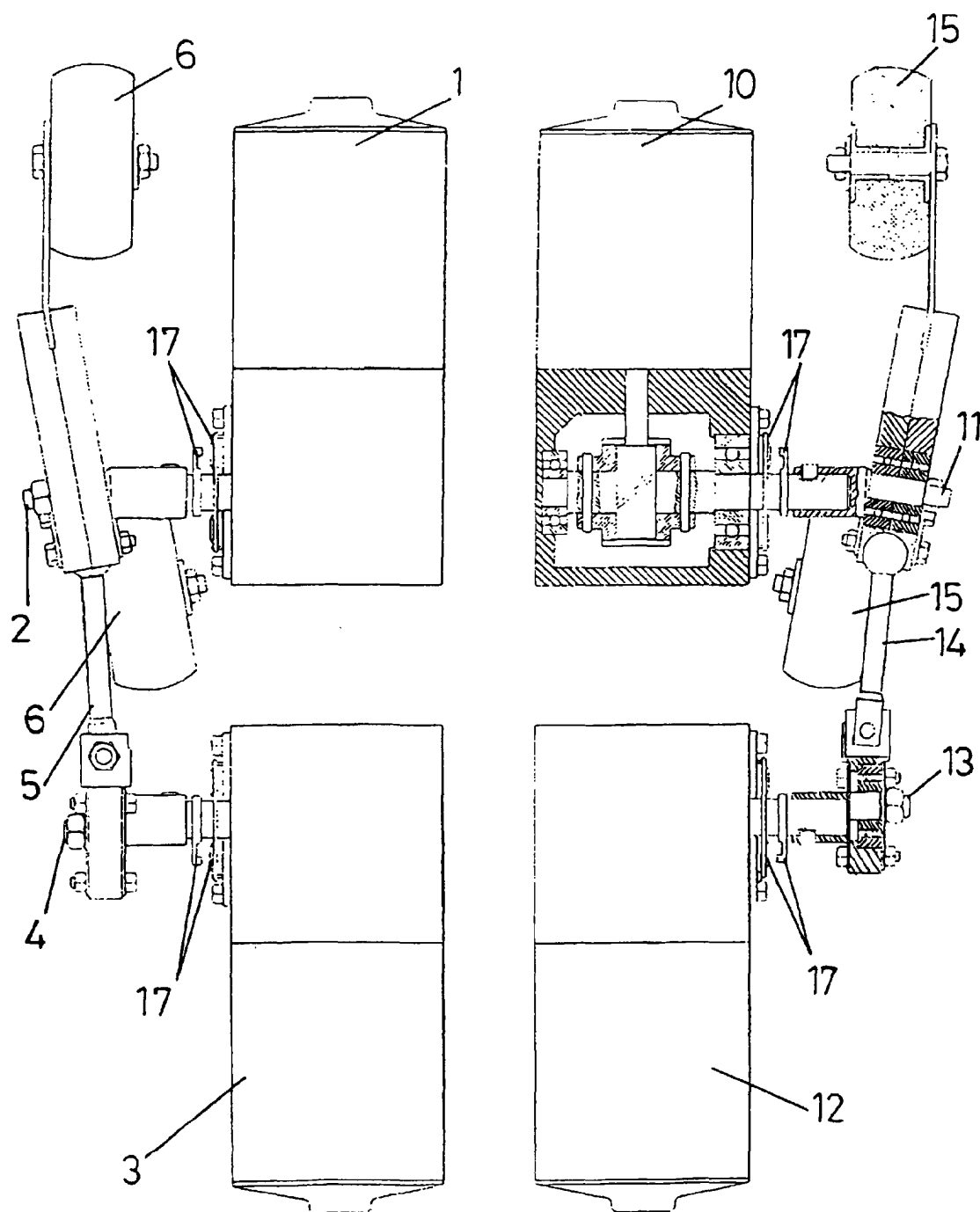


FIG. 5

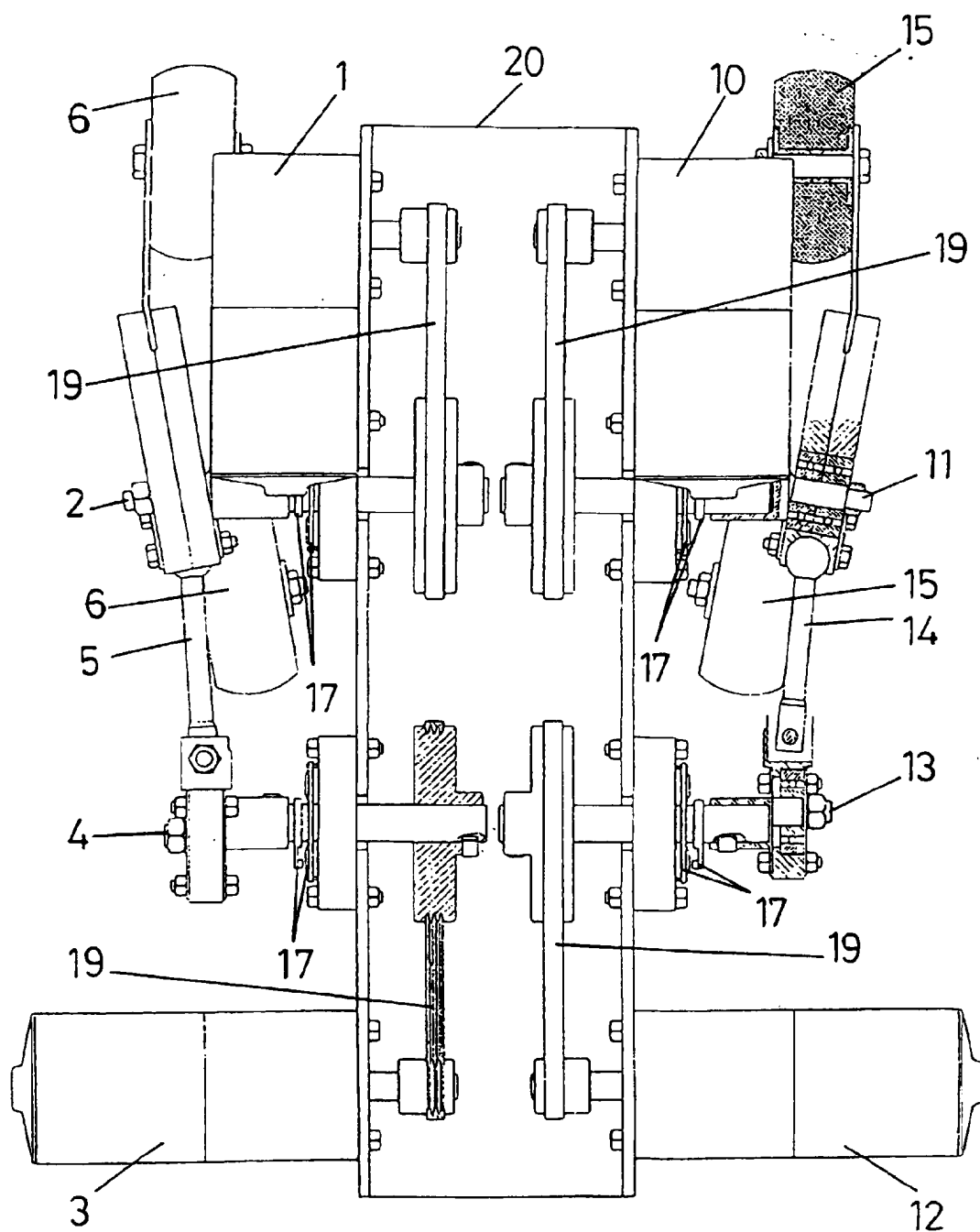


FIG. 6

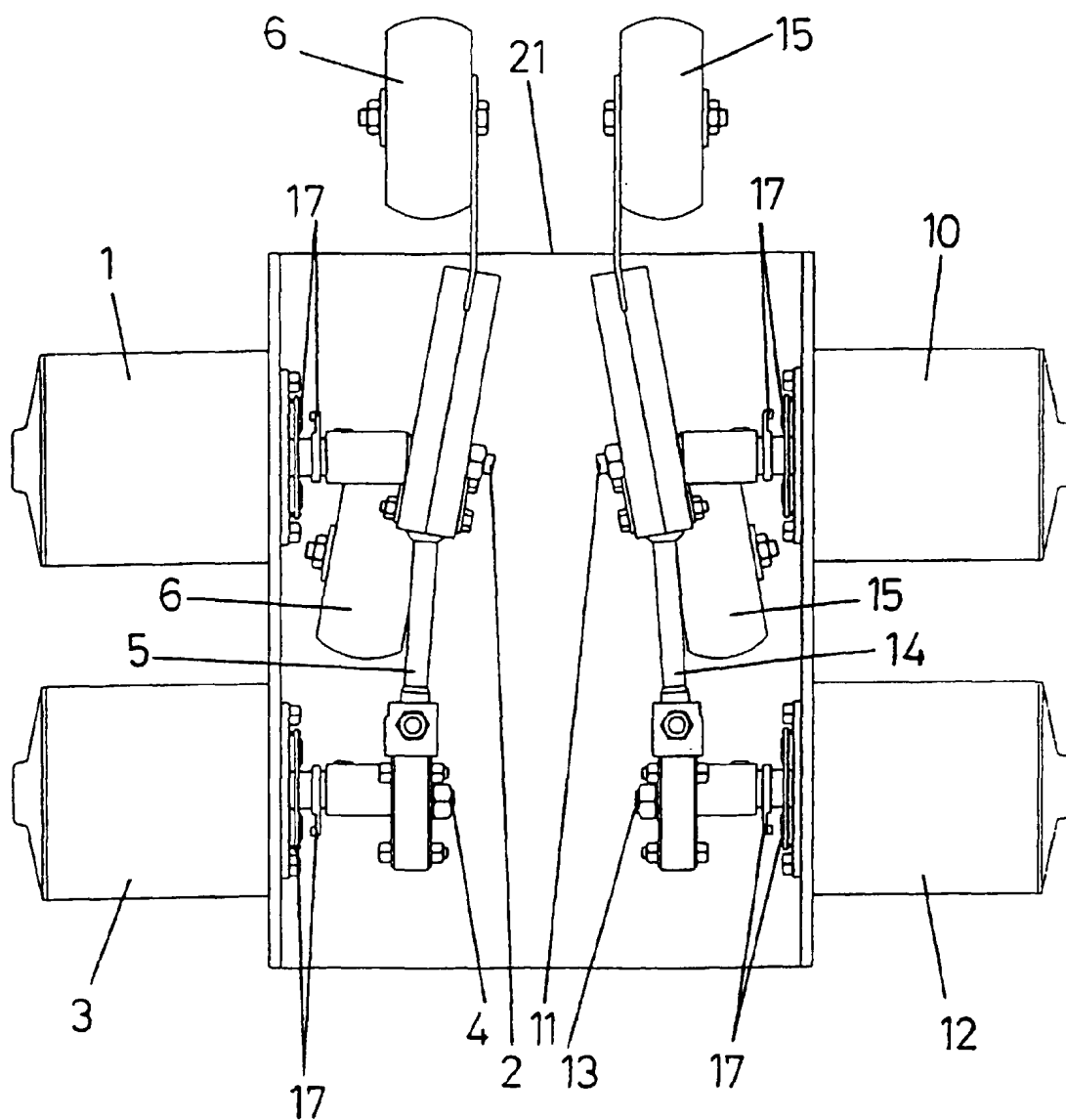


FIG.7

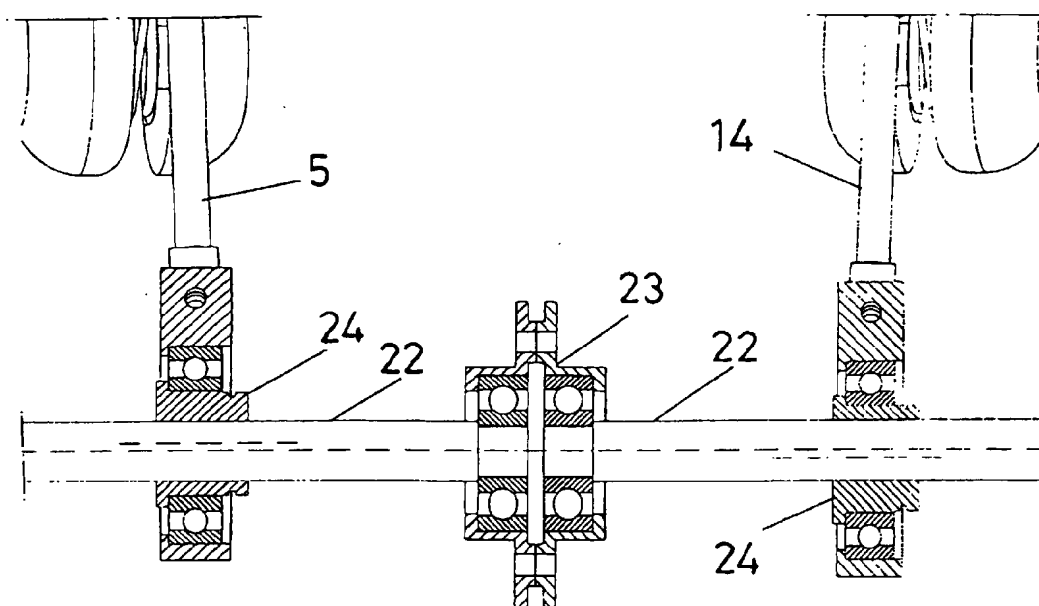
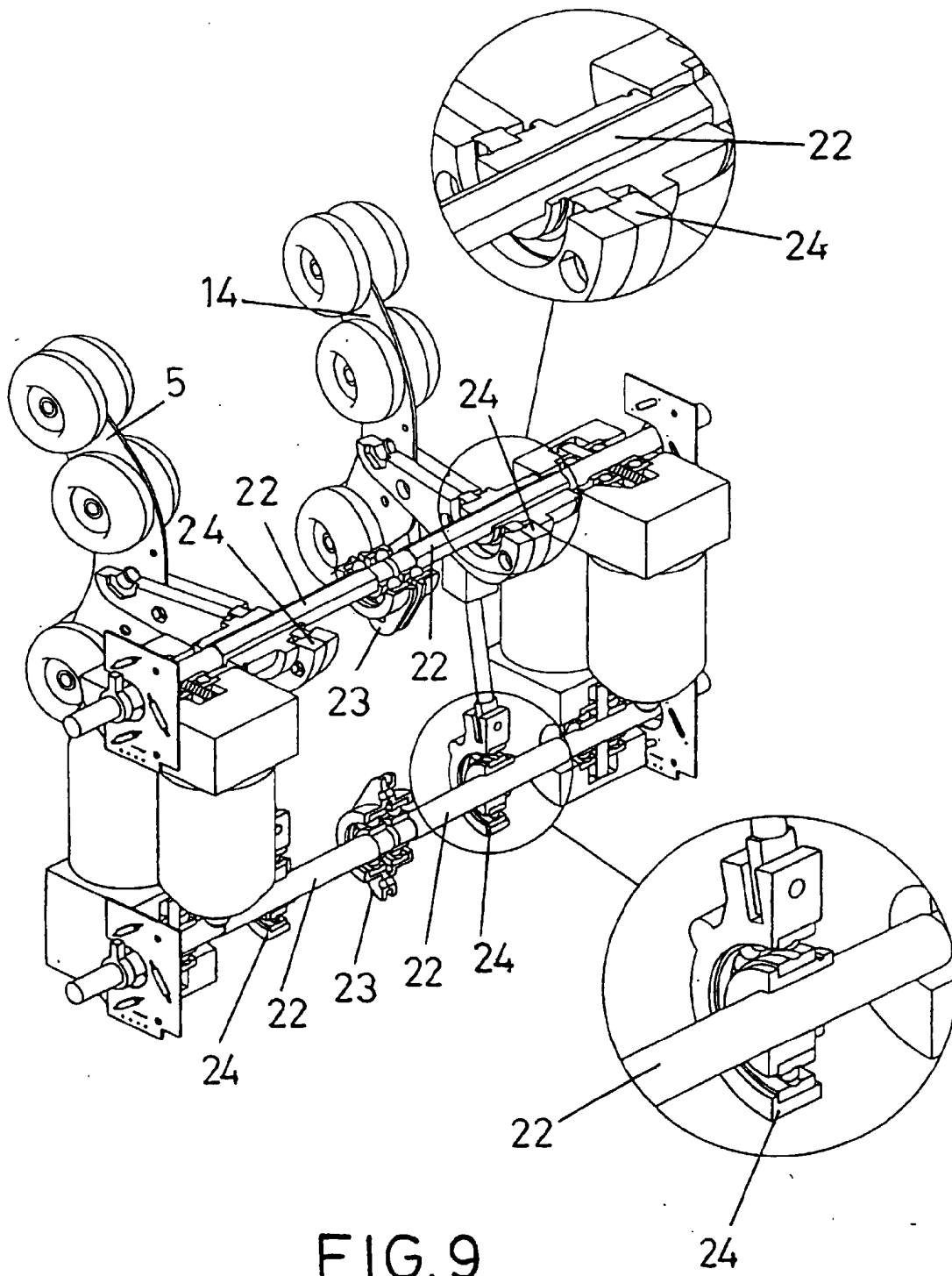


FIG. 8





## INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES 98/00172

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 6 A61H 15/00, A61H 23/00, A61H 1/00 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 6 A61H Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) CIBEPAT, EPODOC, PAJ, WPI.		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 462 516 A (ANDERSON) 31 October 1995 (31.10.95) the whole document.	1,3-5
A	US 5 052 376 A (YAMASAKI) 1 October 1991 (01.10.91) abstract; column 1, lines 6-10; column 3, line 20 - column 5, line 35; figures 2-5.	1,3-7
A	US 5 020 518 A (SPEARS et al.) 4 June 1991 (04.06.91) the whole document.	1,3-5
A	US 3 322 116 A (MURPHY) 30 May 1967 (30.05.67) column 1, lines 57-60; column 2, line 61 - column 3, line 32; column 4, lines 7-9; figures 1-4	1,4,5
A	WO 96 01610 A (FRANCE BED CO. LTD.) 25 January 1996 (25.01.96) page 21, line 14 - page 23, line 5; figure 13.	1,4,5
A	US 4 009 710 A (INADA) 1 March 1977 (01.03.77) column 1, lines 38-42; column 2, line 31 - column 3, line 62; column 4, lines 14-28; figures 1-4,8,9.	1,4,6,8
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, each combination being obvious to a person skilled in the art "A" document member of the same patent family		
Date of the actual completion of the international search 2 September 1998 (02.09.98)		Date of mailing of the international search report 10 September 1998 (10.09.98)
Name and mailing address of the ISA/ S.P.T.O.		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES 98/00172

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 718 408 A (BARREIRO) 12 January 1988 (12.01.88) column 2, line 17 - column 3, line 6; figures 1-5	1,5,6

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No  
PCT/ES 98/00172

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